

Safely storing chemicals when space is limited

A proper chemical storage system separates materials according to chemical compatibility and hazard class. Many schools try to use the chemical storage system found in Flinn Scientific's catalog. Unfortunately, many school stockrooms are too small to provide 23 separated locations for classes of chemicals. The chart on the next page combines categories of chemicals that have similar hazardous characteristics. By doing so, you will only need 12 separate storage locations.

Here are some tips for creating safer chemical storage rooms:

- Maintain a current inventory of the chemical compounds in each stockroom.
- Chemicals should be purchased in the smallest quantity available based on school's needs (no more than 5 years' worth).
- All chemicals should be dated upon receipt into the lab or storage area.
- Old and excess chemicals should be routinely removed from inventory and properly disposed of.
- Confirm Safety Data Sheets are available for each chemical in the stockroom.
- Confirm adequate primary and secondary labels include relevant pictograms or warning labels.
- Store chemical containers below eye level if possible.
- Store solids above and liquids below.
- Separate inorganic compounds from organic compounds.



If storage cabinets are available, remember:

- Storage cabinets for acids, bases and flammables are meant for liquids, not dry solids.
- Acid cabinets should be vented per local guidelines to prevent vapor build-up.
- Store concentrated sulfuric acid on one shelf of the acid cabinet and concentrated hydrochloric acid on another.
- Store nitric acid in a secondary container with other inorganic acids or a separate cabinet.
- Do not vent flammable liquid storage cabinets unless an explosion-proof fan is carrying the vapors directly out of the building.
- Glacial acetic acid is a flammable liquid; store it in a dedicated organic acid cabinet or in the flammable liquids cabinet.
- Flammable liquids like alcohols must not be stored in conventional refrigerators.



HOW TO SAFELY SEPARATE USING 12 CHEMICAL GROUPS

Inorganic Reactives & Metals (I-1, I-10) Sulfur, Phosphorus (double packaged), Arsenic, Solid Metals, Hydrides, Lithium, Sodium	Corrosive Base Storage Cabinet (I-4 Liquids) >1.0 molar Ammonium Hydroxide, Sodium Hydroxide, Calcium Hydroxide (limewater), Potassium Hydroxide, Oxides, Silicates
Inorganic Salts (I-2) Chlorides, Iodides, Fluorides, Bromides, Sulfates, Sulfites Thiosulfates, Phosphates.	Non-metal Corrosive Acid Storage Cabinet (I-9 Liquids) Hydrochloric Acid, Sulfuric Acid, Hydrobromic Acid, Phosphoric Acid, Perchloric Acid. Nitric acid separately stored in this or another cabinet. Limit Nitric Acid to a 5-year supply.
Inorganic Oxidizers (I-3, I-6, I-8) Nitrates, Nitrites, Borates, Chromates, Manganates, Permanganates, Chlorates, Chlorites, Peroxides, Azides.	Flammable Storage Cabinet (O-2, O-3, O-4, O-8 & concentrated organic bases) NOT VENTED! Alcohols, Glycols, Phenol, Hydrocarbons, Cresols, Esters, Ethers, Propionic Acid, Formic Acid, Glacial Acetic Acid, Lactic Acid
Inorganic Corrosive Bases (O-4) (Dry Chemicals) Dry Hydroxides, Oxides, Silicates, Carbonates, Carbon	Dry and Dilute Organic Acids & Anhydrides (O-1) Citric Acid, Anhydrides, Peracids, etc.
Inorganic #5 and #7 Toxins Arsenates, Cyanides, Sulfides, Selenides, Phosphides, Carbides, Nitrides	Miscellaneous Household chemicals (vinegar, baking soda, vegetable oils), Dyes, Stains, Agars, Sugars, Gels
Organic Toxins (O-5, O-7) Epoxy Compounds, Isocyanates, Sulfides, Polysulfides	
Organic Reactives #6 Peroxides, Azides, Hydroperoxides	

Dilute solutions at or below 1.0 molar can be stored on shelves rather than in cabinets. Segregate inorganic and organic compounds. Check containers annually for condition of containers, labels and contents. Replace degraded lids, dropper tops and solutions.

To prevent release of corrosive vapors, avoid storing pipettes holding acids or bases in test tubes taped to the side of bottles. Wrap fritted glass stoppers on acid bottles in parafilm to reduce evaporation. Store iodine crystals in a sealed plastic bag to monitor degradation of the container's cap and reduce indoor air pollution.

Content adapted from <https://www.hazwastehelp.org/educators/rehabthelab.aspx>

For additional assistance with lab chemical storage and handling as well as chemical disposal, please contact Kevin Merchel with Pollution Prevention Assistance at Kevin.Merchel@clark.wa.gov.

For more information about environmental health in schools, please email the School Health & Safety staff at DLCntyHealthSchools@clark.wa.gov.



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